

AERONAUTICS

America's Fastest Plane

The Army's P-80 Shooting Star was made possible by two revolutionary types of jet engines. Engines are designated as the I-16 and the I-40.

► TWO revolutionary types of jet engines made possible America's fastest plane, the Army P-80 Shooting Star, headquarters of the Air Technical Service Command at Wright Field has revealed. The engines are designated as the I-16 and the I-40.

The I-16, created by General Electric Company and Army engineers, was used in the P-59 trainer in which jet pilots were trained. From it was developed the more powerful I-40, sometimes called the super G-E jet.

The basic principle of the two engines is the same. The chief difference lies in an improved line of gas-flow through the main turbine.

In both engines, air is drawn through an intake duct in the front and forced into the combustion chamber by means of a centrifugal compressor. This is simply a high-speed fan.

Kerosene is used for fuel. It is injected into the combustion chamber where it is atomized, mixed with air, and burned. Continuous combustion of the kerosene occurs at approximately a constant high pressure, resulting in a stream of high-velocity gas which is released through the rear nozzle, thus driving the plane forward. The turbine, a fan-like wheel, is activated by this stream of gas and provides power for the compressor.

In the I-16 the course of the stream of gas is reversed twice in this process, while in the I-40 the flow is direct, resulting in less loss of power. This is the main difference. Both engines are developments from the British jet engine invented by Air Commodore Frank Whittle.

Rigid flight tests of the I-40 jet engine are now being made by the General Electric Company, with the engines installed in converted B-24 Liberators. This was revealed by N. F. Frischhertz, one of the company's engineers, at the recent New York meeting of the American Society of Mechanical Engineers. This is for the future development and testing of the jet engine under actual flying conditions.

The converted Liberators are called "flying laboratories" and are used be-

cause they provide a great number of facilities and advantages of a ground test cell, or wind tunnel, at considerably less cost and with greater availability. Their use also allows flight space for design engineers to observe operation under flight conditions.

At the same meeting of mechanical engineers, Dr. William F. Durand, formerly chairman of engineering and industrial research, National Research Council, declared that future development of jet propulsion demands continuing detailed research into design and construction, both in the jet engine and the plane on which it is to be used. The jet engine "will undoubtedly occupy a highly important place in the field of aircraft propulsion," he said.

Science News Letter, January 5, 1946

AERONAUTICS

Improved Methods Needed For Airplane Traffic

► AIRLINERS are now spanning oceans and continents with a volume of traffic which creates serious hazard situations calling for vastly improved methods for handling arrivals and departures at established terminals, engineers were told at the Chicago meeting of the Society of Automotive Engineers. International air traffic, they were informed, already has reached proportions that make airways control and air navigation problems of the first magnitude, demanding prompt solution.

Navigation aids for long-range flights, developing far beyond those available to other transportation media, were said to contribute to the efficiency of aviation operation, with war-developed electronic and radar devices widely applicable. Contrast was drawn between the ease and safety en route over the ocean, and the delays, difficulties and dangers created by congestion at the air terminals.

The development of a comprehensive system of air navigation, control and communications was proposed by Capt. S. P. Saint of American Airlines. It should include, he said, every known principle of safety engineering. He as-

serted that such a system would provide flexibility of movement for all planes, have no limitations other than air space, and would automatically coordinate air traffic and maintain separations.

Self-checking communication devices, he continued, would establish continuous two-way channels between each airplane and the automatic control system and handle all routine clearance, thus freeing normal voice communication for special services. He proposed to aid navigation by using self-checking radar ground beacons affording all pilots precise holding patterns, but permitting ground control to change routings when necessary.

Air-conditioning airplanes by the installation of air turbine refrigeration was described by Bernard L. Messinger of the Lockheed Aircraft Corporation. The advantages of this system, he said, are simplicity, lightness, compactness, and a highly effective use of air as a refrigerant.

Vapor-compression cycle refrigeration, generally used commercially on the ground, was reported to be unsatisfactory for aircraft, he stated, because of mechanical complications, excessive

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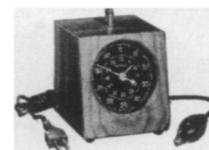


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weight, heavy power requirements, and relatively low efficiency.

Mr. Messinger characterized as a "popular misconception" the belief of some engineers that aircraft air conditioning does not require refrigeration because planes fly at high altitudes. Passengers and mechanical equipment, he said, tend to make cabin interiors warmer than might be expected.

Science News Letter, January 5, 1946

African bongo are called the hand-somest of all the antelopes.

Improved soap is possible with the use of molecularly dehydrated phosphates, it is claimed by chemists who state that such soaps will have nearly twice the cleansing power of ordinary pure soap.

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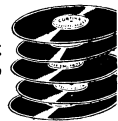
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Books of the Week

THE CHEMICAL PROCESS INDUSTRIES—R. Norris Shreve—*McGraw*, 957 p., illus. and charts, \$7.50. A textbook for engineers.

A FUTURE FOR PREVENTIVE MEDICINE—Edward J. Stieglitz—*The Commonwealth Fund*, 77 p., charts, \$1. A program for the development of preventive medicine, defined as "the attainment by the individual of optimal development and performance."

MEN WITHOUT GUNS—DeWitt Mackenzie—*Blakiston*, 152 p., illus., \$5. A record of the work of the Army Medical Corps, in 177 drawings and 118 full color plates by famous contemporary artists. Foreword by Maj. Gen. Norman T. Kirk, Surgeon General, U. S. Army.

MY GARDEN DAY-BY-DAY 1946—*Tool Shed*, \$1. A week of gardening advice and verses to each large page of this calendar, with room for notes.

SCIENCE AND SCIENTISTS IN THE NETHER-

LANDS INDIES—Pieter Honig and Frans Verdoorn, Eds.—*Board for the Netherlands Indies (Stechert)*, 491 p., illus. and charts, \$4.00. Technical articles dealing with the development of various branches of science in the Netherlands Indies. Although prepared by the Government of the Netherlands Indies, "the editors have attempted to keep the work free of narrow political considerations."

STORMS, FLOODS AND SUNSHINE: A Book of Memoirs—Isaac Monroe Cline—*Pelican*, 290 p., photographs, charts, \$3. Experiences of a meteorologist who spent over 50 years in the service of the U. S. Weather Bureau. Bibliography is included.

THE WHEATS OF CLASSICAL ANTIQUITY—Naum Jasny—*Johns Hopkins Press*, 176 p., illus., \$1.75. The Johns Hopkins University Studies in Historical and Political Science, Series LXII, No. 3.

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ENGINEERING

Glass-Reinforced Plastic

➤ FINE GLASS fibers used to reinforce plastics, much as steel rods are used to reinforce concrete, make a plastic material with greater strength than the structural metals, H. W. Collins of Owens-Corning Fiberglas Corporation stated at a meeting of the American Institute of Chemical Engineers in Chicago. The war-developed material, widely used in military aircraft, will have many peacetime applications.

The glass-reinforced plastic material does not corrode and is dimensionally stable, he declared, and can be fabricated without costly dies. The plastics industry now has a material that can be thought of in terms of the metals and their uses, he added. It is possible that the glass-reinforced plastic may be used "for such products as railroad car, bus, automobile and truck body parts; for boats and canoes, for luggage and furniture, for piping, for kitchen and bathroom assemblies, and home appliances."

Because the low-pressure resins used in combination with the glass fibers polymerize without giving off volatiles, he explained, it is possible to cure them in any shape merely by holding them in contact with the mold. This makes it possible for manufacturers to produce very large parts, such as the whole top of a Pullman car or the hull of a boat, without the expense and physical limitations imposed by the use of high-pressure presses.

Strength properties attainable with

glass-reinforced plastics are, according to Mr. Collins: tension, 76,000 pounds per square inch; compression, 68,000 pounds per square inch; and flexure, 112,000 pounds per square inch.

Science News Letter, January 5, 1946

RADIO

Engineer on Moving Train Talks to Yardmaster

➤ FIRST TRYOUT of ultra-high-frequency radio communication between moving railroad engines and control towers was made at the Wayne Junction yard of the Reading railroad, near Philadelphia. Two-way conversations were successfully conducted between the yardmaster's office and three diesel-electric locomotives moving about the yard. The principal advantage of using very high frequency waves is that they are basically static-free.

The center of the system is a 25-watt transmitter in the yardmaster's office. The locomotives are equipped with 15-watt transmitters. Tests are scheduled to continue for about three months. They are under the direction of Nelson Wells of Maguire Industries, Inc., who devised the equipment and supervised its installation.

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A new tobacco, low in nicotine and as aromatic as expensive Turkish products, has been developed by the University of Kentucky.